

# INVESTIGATOR'S ANNUAL REPORT

## National Park Service

All or some of the information provided may be available to the public

<b>Reporting Year:</b> 2001	<b>Park:</b> Glacier Bay NP & PRES	
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<b>Permit #:</b> GLBA-2001-SCI-0003		
<b>Park-assigned Study Id.#:</b> GLBA-00003		
<b>Study Title:</b> Glacier Bay Oceanographic Patterns		
<b>Permit Start Date:</b> May 01, 2001	<b>Permit End Date:</b> Dec 31, 2010	
<b>Study Start Date:</b> May 01, 2001	<b>Study End Date:</b> Dec 31, 2010	
<b>Study Status:</b> Continuing		
<b>Activity Type:</b> Research		
<b>Objectives:</b> <p>This project involves the monitoring of within and between year oceanographic patterns along the glacial chronosequence in Glacier Bay, Alaska. Glacier Bay exhibits large spatial and temporal differences in oceanographic patterns due to complex fjord and estuarine processes the recent history of glaciation, and large numbers of tidewater glaciers. A lack of understanding of the natural variation in this system make the elucidation of anthropogenic changes problematic and fraught with controversy.</p>		
<b>Findings and Status:</b> <p>This was the ninth year of a continuing study to monitor oceanographic patterns in Glacier Bay. The report on the Oceanographic system in Glacier Bay went through final peer review and was released to the public this year. There were several major findings in this report, changing the paradigm of oceanographic dynamics in Glacier Bay, these included: deep water renewal occurring throughout the year, that Glacier Bay is not a traditional estuary but instead is a tidally mixed estuary, that there is a mid-bay front creating conditions for extremely high primary productivity which was observed to continue throughout the spring, and that temperatures have increased since the 1960s which may explain the lowered salinity and some of the major differences seen in this study. Analysis efforts began on looking at the inter-year variation in oceanographic conditions in Glacier Bay and their relationship with regional and global patterns in order to potentially describe some of the underlying variation in the environment that may explain fluctuations in animal abundance seen in Glacier Bay.</p> <p>Field efforts continued this year with six surveys of twenty-four stations. A profile with salinity, temperature, primary productivity, (chlorophyll a concentration), light penetration, and turbidity was taken at one meter intervals at each site. In addition we obtained sediment samples at most of the stations in order to calibrate the optical backscatter sensor. This will allow us to look at differences in sedimentation rates, which appear to be driving photic depth and thus be a major determinant of marine productivity in Glacier Bay. We also began investigations into the current patterns of the lower bay and where the source waters of the bay come from. In this</p>		

study we deployed a Doppler Current meter and Current Drifters to investigate the flow patterns into the Bay. Preliminary results suggest that North Passage (and thus the outer coast waters) are the primary source of inflow into Glacier Bay despite previous papers suggesting Icy Strait was the prime component of renewed water. These results explain the more saline waters found intruding into the Bay and indicate a more nutrient rich source which may explain part of the high productivity seen in Glacier Bay.

Reports Produced:

- 1)Fjord Oceanographic Processes in Glacier Bay Final Peer Reviewed
- 2)Fjord Oceanographic Monitoring Handbook: Glacier Bay Version 2.0
- 3)Glacier Bay Oceanography CDROM Version 2.0
- 4)The Oceanographic Analyst Software CDROM Version 1.5

**For this study, where one or more specimens collected and removed from the park but not destroyed during analyses?**  
No

**Funding provided this reporting year by NPS:**  
20000

**Funding provided this reporting year by other sources:**  
40000

**Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college**

**Full name of college or university:**

**Annual funding provided by NPS to university or college this reporting year:**  
0

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